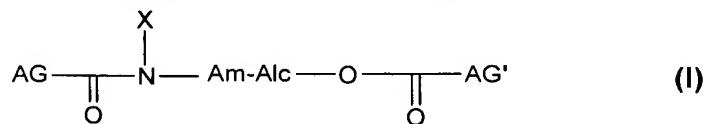


## CLAIMS :

1. Process for the synthesis of ceramide-type compounds, characterized in that it includes at least an amide formation step, performed by means of the lipase B-type enzyme of *Candida antartica*, and an esterification step, also performed by means of a lipase-type enzyme, and in that the ceramide-type compounds correspond to the general formula (I) :

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in which the group Am-Alc figures a C2 to C6 carbon chain, preferably saturated, linear or optionally branched, obtained from an amino-alcohol ; X figures a hydrogen atom or a C1 to 10 C4 carbon chain, optionally hydroxylated on the 2' and/or following positions of the amino group ; and in which each of the groups AG and AG' figures a C4 to C30 carbon chain, saturated or unsaturated, obtained from a fatty acid or a fatty acid ester ; the two groups AG and AG' may be identical or different.

15 2. Process according to claim 1, characterized in that the amide formation step is carried out under stoichiometric conditions between a fatty acid and/or its ester and an amino-alcohol at a temperature comprised between 40 and 100°C.

20 3. Process according to claim 1 or claim 2, characterized in that the amide formation is carried out without solvent, at a minimal temperature of about 65°C.

4. Process according to one of the claims 1 to 3, characterized in that the amide formation is carried out under a reduced pressure comprised between 1 and 500 mbars and during at least 16 hours.

25 5. Process according to one of the claims 1 to 4, characterized in that the esterification is performed by means of the *Rhizomucor miehei* lipase.

30 6. Process according to claim 5, characterized in that the esterification reaction is carried out with a ratio fatty acid ester/amino-alcohol comprised between 1 and 2.

7. Process according to claim 5 or claim 6, characterized in that the esterification reaction is carried out at a temperature comprised between 40 and 90°C.

35 8. Process according to one of the claims 5 to 7, characterized in that the esterification reaction is carried out without solvent, at a minimal temperature of about 65°C.

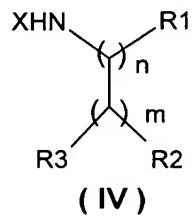
9. Process according to one of the claims 5 to 8, characterized in that the esterification reaction is carried out under a reduced pressure comprised between 1 and 500 mbars and during at least 18 hours.

5 10. Process according to one of the claims 1 to 9, characterized in that the enzymes used in each step are immobilized on an inert support.

11. Process according to one of the claims 1 to 10, characterized in that the amide formation reaction by means of the *Candida antartica* lipase B and the esterification reaction by means of the *Rhizomucor miehei* lipase are both carried out without solvent, optionally 10 simultaneously, at a minimal temperature of about 65°C and under a reduced pressure comprised between 30 and 200 mbars.

12. Process according to one of the claims 1 to 11, characterized in that the amino-alcohols are C2 to C6 compounds, preferably saturated, linear or optionally branched and the fatty acids and/or their esters have a C4 to C30, preferably C10 to C22 carbon chain, saturated or 15 unsaturated, optionally hydroxylated.

13. Process according to one of the claims 1 to 12, characterized in that the starting amino-alcohol corresponds to formula (IV):



in which :

20 - n is an integer selected from the numbers 1, 2, 3 and m is an integer selected from the numbers 1, 2, 3,

- X is selected from the group composed of hydrogen and a C1 to C4 carbon chain, optionally hydroxylated on the positions 2' and/or followings of the amino group;

- R1 is selected from the group composed of hydrogen and a C1 to C4 carbon chain, 25 preferably saturated, linear, optionally branched and/or hydroxylated,

- R2 is selected from the group composed of hydrogen, -OH, NH<sub>2</sub> and a C1 to C4 carbon chain, preferably saturated, linear, optionally branched and/or hydroxylated,

- R3 is selected from the group composed of hydrogen, -OH and -CH<sub>2</sub>OH,

30 and in which at least one of the groups R1, R2 or R3 includes a -OH group.

14. Process according to one of the claims 1 to 13, characterized in that the amide formation step is performed before the esterification step.

## S U M M A R Y

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This invention relates to the field of the chemistry of fats and more particularly to the synthesis of ceramide-type compounds.

10 This invention substantially lies in the synthesis of ceramide-type compounds ; more particularly, this invention has for an object a novel method of enzymatic synthesis including at least a step of amide formation and a step of esterification performed by lipases, between fatty acids and/or esters of fatty acids and amino-alcohols. The ceramide-type compounds thus obtained may be used in the form of cosmetic and/or pharmaceutical compositions, particularly dermatological, in combination or admixed with one or several 15 excipients or vehicles suitable for cosmetics or pharmaceutics.

20 This method finds an interest namely in the synthesis of active principles useful in the field of cosmetics and/or pharmaceutics and more particularly in the field of dermatology.